



Disaster and Emergency Management Resources

Landslide and Mudflow Management Measures

Before a Landslide or Mudflow Occurs

- Become familiar with the land around you. Learn whether landslides and debris flows have occurred in your area by contacting local officials, state geological surveys, soil conservation officials. The following areas are more likely to experience landslides or mudflows:
 - Areas where wildfires or human modification of the land have destroyed vegetation
 - Areas where landslides have occurred before
 - Steep slopes and areas at the bottom of slopes or canyons
 - Slopes that have been altered for construction of buildings and roads
 - Channels along a stream or river
 - Areas where surface runoff is directed
- Watch the patterns of storm-water drainage on slopes near your home, especially places where runoff water converges, increasing flow over soil-covered slopes. Watch the hillsides around your home for any signs of land movement, such as small landslides or debris flows, or progressively tilting trees. Watching small changes could alert you to the potential of a greater landslide threat.
- Plant ground cover on slopes and build retaining walls, channels, or deflection walls to direct the flow around buildings. Remember: If you build walls to divert debris flow and the flow lands on a neighbor's property, you may be liable for damages.

- Learn to recognize landslide-warning signs.
 - Doors or windows stick or jam for the first time.
 - New cracks appear in plaster, tile, brick, or foundations.
 - Outside walls, walks, or stairs begin pulling away from the building.
 - Slowly developing, widening cracks appear on the ground or on paved areas such as streets or driveways.
 - Underground utility lines break.
 - Bulging ground appears at the base of a slope.
 - Fences, retaining walls, utility poles, or trees tilt or move.
 - You hear a faint rumbling sound that increases in volume as the landslide nears. The ground slopes downward in one specific direction and may begin shifting in that direction under your feet.
- If you are at risk from landslides, talk to your insurance agent and make evacuation plans. Plan at least two evacuation routes because roads may become blocked or closed.
- Contact local authorities about emergency and evacuation plans.
- Make a Family Disaster Plan and Supply Kit (See Sections 2.2 – 2.4)
- Develop an emergency communication plan in case family members are separated.
- If you live in an area particularly vulnerable to landslides, consider relocation.

During a Landslide or Mudflow

- Stay alert and awake. Many debris-flow fatalities occur when people are sleeping. Listen to a NOAA Weather Radio or portable, battery-powered radio or television for warnings of intense rainfall. Be aware that intense, short bursts of rain may be particularly dangerous, especially after longer periods of heavy rainfall and damp weather.
- If you are in areas susceptible to landslides and debris flows, consider leaving if it is safe to do so. Remember that driving during an intense storm can be hazardous. If you remain at home, move to a second story if possible. Staying out of the path of a landslide or debris flow saves lives.

- Listen for any unusual sounds that might indicate moving debris, such as trees cracking or boulders knocking together. A trickle of flowing or falling mud or debris may precede larger landslides. Moving debris can flow quickly and sometimes without warning.
- If you are inside a building, stay inside. And take cover under a desk, table, or other piece of sturdy furniture.
- If you are outdoors try to get out of the path of the landslide or mudflow by running to the nearest high ground away from the path. If rocks and other debris are approaching, run for the nearest shelter such as a group of trees or a building.
- If you are near a stream or channel, be alert for any sudden increase or decrease in water flow and for a change from clear to muddy water. Such changes may indicate landslide activity upstream, so be prepared to move quickly. Don't delay! Save yourself, not your belongings.
- Be especially alert when driving. Embankments along roadsides are particularly susceptible to landslides. Watch the road for collapsed pavement, mud, fallen rocks, and other indications of possible debris flows.
- Contact your local fire, police, or public works department. Local officials are the best persons to assess potential danger.
- Inform affected neighbors. Your neighbors may not be aware of potential hazards. Advising them of a potential threat may help save lives. Help neighbors who may need assistance to evacuate.

After a Landslide or Mudflow

- Stay away from the slide area. There may be danger of additional slides.
- Check for injured and/or trapped persons near the slide, without entering the direct slide area. Direct rescuers to their locations.
- Help a neighbor who may require special assistance.
- Listen to local radio or television stations for the latest emergency information

- Watch for flooding, which may occur after a landslide or debris flow. Floods sometimes follow landslides and debris flows because they both may be started by the same event.
- Look for broken utility lines and report them to appropriate authorities. Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further hazard and injury.
- Check the building foundation, chimney, and surrounding land for damage. Damage to foundations, chimneys, or surrounding land may help you assess the safety of the area.
- Replant damaged ground as soon as possible because erosion caused by loss of ground cover can lead to flash flooding.
- Seek the advice of a geotechnical expert for evaluating landslide hazards or designing corrective techniques to reduce landslide risk. A professional will be able to advise you of the best ways to prevent or reduce landslide risk, without creating further hazard.

Adapted from resource material developed by the Federal Emergency Management Agency